FEDERAL-STATE-PRIVATE
COOPERATIVE SNOW SURVEYS



# WATER SUPPLY OUTLOOK FOR WESTERN UNITED STATES

## Including Columbia River Drainage in Canada

Prepared by

U. S. DEPARTMENT of AGRICULTURE ★ SOIL CONSERVATION SERVICE

Collaborating with
CALIFORNIA DEPARTMENT of WATER RESOURCES
and
BRITISH COLUMBIA DEPARTMENT of
LANDS, FORESTS and WATER RESOURCES

AS OF
MAY 1, 1972

## TO RECIPIENTS OF WATER SUPPLY OUTLOOK REPORTS:

Most of the usable water in western states originates as mountain snowfall. This snowfall accumulates during the winter and spring, several months before the snow melts and appears as streamflow. Since the runoff from precipitation as snow is delayed, estimates of snowmelt runoff can be made well in advance of its occurrence. Streamflow forecasts published in this report are based principally on measurement of the water equivalent of the mountain snowpack.

Forecasts become more accurate as more of the data affecting runoff are measured. All forecasts assume that climatic factors during the remainder of the snow accumulation and melt season will interact with a resultant average effect on runoff. Early season forecasts are therefore subject to a greater change than those made on later dates.

The snow course measurement is obtained by sampling snow depth and water equivalent at surveyed and marked locations in mountain areas. A total of about ten samples are taken at each location. The average of these are reported as snow depth and water equivalent. These measurements are repeated in the same location near the same dates each year.

Snow surveys are made monthly or semi-monthly from January 1 through June 1 in most states. There are about 1900 snow courses in Western United States and in the Columbia Basin in British Columbia. Networks of automatic snow water equivalent and related data sensing devices, along with radio telemetry are expanding and will provide a continuous record of snow water and other parameters of key locations.

Detailed data on snow course and soil moisture measurements are presented in state and local reports. Other data on reservoir storage, summaries of precipitation, current streamflow, and soil moisture conditions at valley elevations are also included. The report for Western United States presents a broad picture of water supply outlook conditions, including selected streamflow forecasts, summary of snow accumulation to date, and storage in larger reservoirs.

Snow survey and soil moisture data for the period of record are published by the Soil Conservation Service by states about every five years. Data for the current year is summarized in a West-wide basic data summary and published about October 1 of each year.

*COVER PHOTO NUMBER ORC 221-3*

## PUBLISHED BY SOIL CONSERVATION SERVICE

The Soil Conservation Service publishes reports following the principal snow survey dates from January 1 through June 1 in cooperation with state water administrators, agricultural experiment stations and others. Copies of the reports for Western United States and all state reports may be obtained from Soil Conservation Service, Western Regional Technical Service Center, Room 209, 701 N. W. Glisan, Portland, Oregon 97209.

Copies of state and local reports may also be obtained from state offices of the Soil Conservation Service in the following states:

| STATE | ADDRESS |
|---|---|
| Alaska | P. O. Box "F", Palmer, Alaska 99645 |
| Arizona | 6029 Federal Building, Phoenix, Arizona 85025 |
| Colorado (N. Mex.) | P. O. Box 17107, Denver, Colorado 80217 |
| Idaho | Room 345, 304 N. 8th. St., Boise, Idaho 83702 |
| Montana | P. O. Box 970, Bozeman, Montana 59715 |
| Nevada | P. O. Box 4850, Reno Nevada 89505 |
| Oregon | 1218 S. W. Washington St., Portland, Oregon 97205 |
| Utah | 4012 Federal Bldg., 125 South State St., Salt Lake City, Utah 84111 |
| Washington | 360 U.S. Court House, Spokane, Washington 99201 |
| Wyoming | P. O. Box 2440, Casper, Wyoming 82601 |

## PUBLISHED BY OTHER AGENCIES

Water Supply Outlook reports prepared by other agencies include a report for California by the Water Supply Forecast and Snow Surveys Unit, California Department of Water Resources, P. O. Box 388, Sacramento, California 95802 --- and for British Columbia by the Department of Lands, Forests and Water Resources, Water Resources Service, Parliament Building, Victoria, British Columbia


USDA-SCS-PORTLAND, OREG 1970

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ISSUED

MAY 1, 1972

The Soil Conservation Service coordinates snow surveys conducted by its staff and many cooperators, including the Bureau of Reclamation, Corps of Engineers, Forest Service, National Park Service, NOAA, National Weather Service, Geological Survey, and other Federal Agencies, Departments of State Government, Irrigation Districts, Power Companies, and others.

The Department of Water Resources coordinates snow surveys in California.

The Water Resources Service, Department of Lands, Forests, and Water Resources directs snow surveys in British Columbia.

This report was prepared by the Water Supply Forecasting Unit, Engineering Division, Soil Conservation Service, from data supplied by Snow Survey Supervisors of the Soil Conservation Service in the States of Alaska, Arizona, Colorado and New Mexico, Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming.

Data from California was supplied by the Chief, Water Supply Forecast and Snow Survey Unit, Department of Water Resources.

Data from British Columbia was supplied by the Chief, Hydrology Division, Water Investigations Branch, Department of Lands, Forests and Water Resources.

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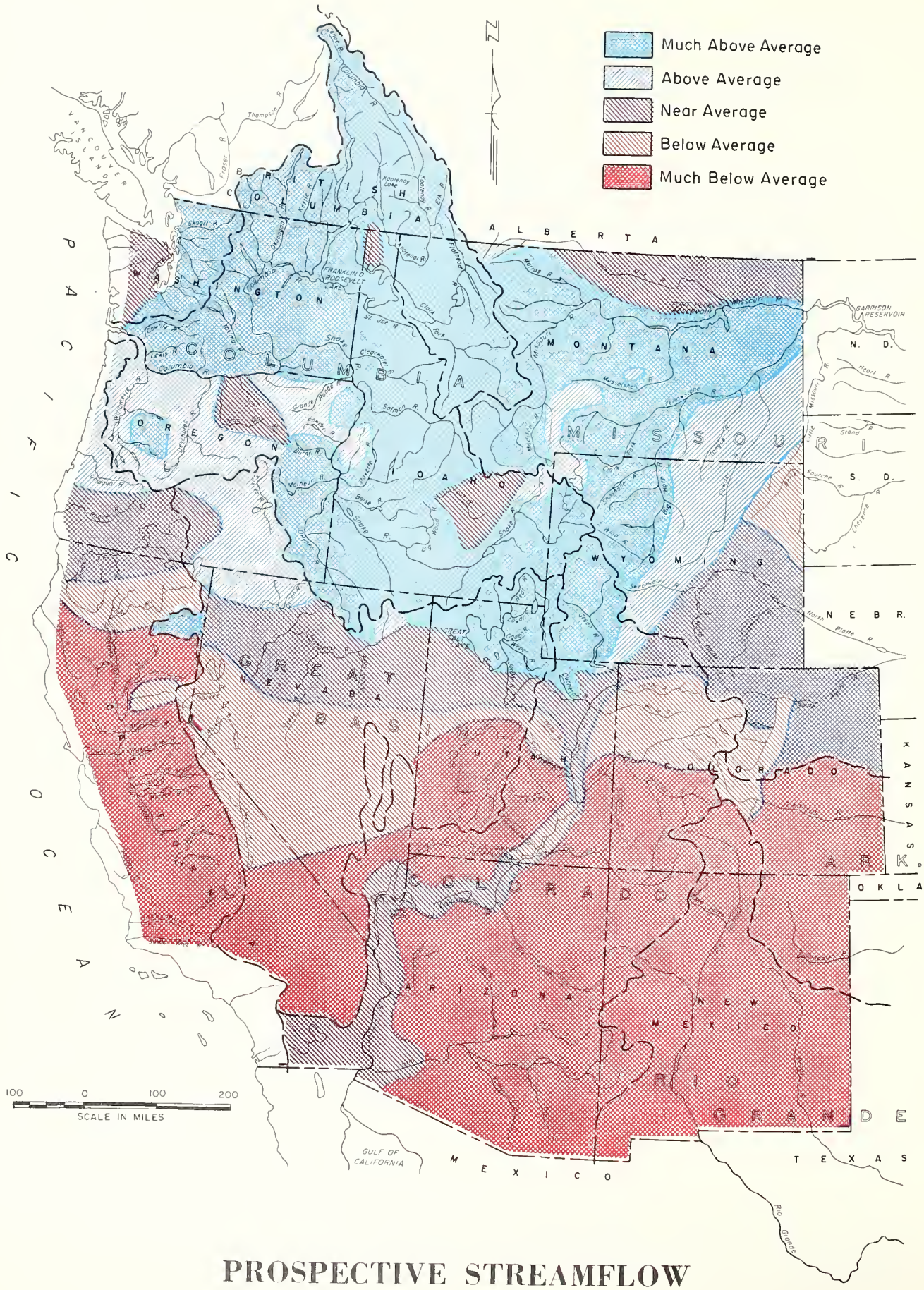
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
KENNETH E. GRANT, ADMINISTRATOR




# PROSPECTIVE STREAMFLOW

USDA-SCS-PORTLAND, OREG. 1971 M7-0-2203 0-C1-L

# WATER SUPPLY OUTLOOK

1972 SNOWMELT SEASON
MAY 1, 1972

HEAVY SNOWPACKS INDICATE STRONG PROBABILITY OF HIGH WATER PROBLEMS IN PARTS OF THE COLUMBIA, MISSOURI, UPPER GREEN RIVER, GREAT SALT LAKE DRAINAGES, AND IN ALASKA. SHORTAGES ANTICIPATED FOR WATER USERS ON NATURAL FLOW RIGHTS IN ARIZONA, NEW MEXICO, AND LIMITED AREAS IN SOUTHERN SECTIONS OF COLORADO, UTAH, NEVADA AND CALIFORNIA. RESERVOIR STORAGE GENERALLY ADEQUATE EXCEPT IN NEW MEXICO.

During April the southern areas of the West experienced a continuation of the dry weather which has prevailed since the beginning of 1972, intensifying the poor outlook for streamflow this summer. In northern areas temperatures were generally cool while precipitation was more typical, with areas of high and low precipitation.

The cool weather in northern areas delayed snowmelt and maintained a serious flood potential on many watersheds. If the weather during the May-June period consists of alternate warm and cool spells, or if it remains cool well into July as it did last year, high water problems from the major snowpack will be held to a minimum. However, if the weather turns warm for an extended period, and particularly if it is accompanied by warm rains, high water damage could become severe in areas above reservoirs, as well as below any not holding adequate flood control space.

The California Department of Water Resources reports that, although above normal precipitation during April through the central Sierra provided some improvement there, elsewhere the State's snowmelt runoff potential continued to deteriorate. The snowpack in California's Cascade Mountains and the Sierra Nevada Ranges on May 1 was about 70 percent of that normally expected for that date. While streamflow during April was below normal in all areas, the total storage in the State's major reservoirs on May 1 was near normal. Southern California, for the fourth consecutive month, experienced much below average precipitation.

Canadian tributaries to the Columbia River have maximum or near maximum of record snowpacks, according to the British Columbia Water Resources Service, Department of Lands, Forests and Water Resources. On these watersheds the snow varies from 141 percent for the Columbia below Revelstoke to 199 percent on the Similkameen River. Runoff from these streams is also expected to be maximum or near maximum of record.

In the Columbia Basin the snow is not only excessive in British Columbia, but is also very heavy on Montana's upper Clark Fork and Bitterroot rivers, on the Cascade Mountains in Washington, on Idaho's Clearwater and Bruneau rivers and on Oregon's Hood, Owyhee, Malheur and Umatilla rivers. Snow here ranges from near 165 to over 200 percent of average. Snow on the majority of watersheds in the Columbia Basin is over 140 percent of normal. Most streams will yield from near 125 to 165 percent of usual amounts.

An unregulated peak flow of near 850 thousand to one million second feet is expected at The Dalles, Oregon. These flows would result in a river stage at Vancouver of 28 to 31 feet. Actual flow and river stage will depend on snowmelt conditions during late May and early June, and on the amount that river regulation reduces the flow. River management agencies have indicated that reservoir regulation will reduce the river stage at Vancouver to about 21 to 23 feet.

In Alaska snowmelt runoff of the Chena and Salcha rivers is forecast at 170 and 146 percent of normal, respectively. These forecasts are typical of conditions in much of Alaska.

In the Missouri Basin snowpacks are greatest, with respect to normal, along the Continental Divide between Glacier and Yellowstone National Parks. Here some areas show maximum of record snow. In general, the Montana snowpack is 130 to 150 percent. In Wyoming it is near 120 to 150 percent except on the North Platte where it is a little above average. Most Montana streams will yield 30 to 60 percent above normal amounts.

In Wyoming, except for the North Platte and its tributaries and the Little Snake River near the Colorado border, where streamflow should be near average, forecasts for most other streams in the Missouri, Snake, Green and Bear river basins range from near 120 to 160 percent of usual amounts.

## SUMMARY OF SNOW WATER EQUIVALENT MEASUREMENTS

MAY 1, 1972

| MAJOR BASIN AND SUB—WATERSHED | WATER EQUIVALENT IN PERCENT OF: LAST YEAR | AVERAGE |
|---|---|---|
| **MISSOURI BASIN** | | |
| Jefferson | 102 | 154 |
| Madison | 85 | 126 |
| Gallatin | 74 | 109 |
| Missouri Main Stem | 104 | 138 |
| Yellowstone | 82 | 127 |
| Shoshone | 82 | 132 |
| Wind | 76 | 147 |
| North Platte | 69 | 116 |
| South Platte | 72 | 97 |
| **ARKANSAS BASIN** | | |
| Arkansas | 93 | 88 |
| Cucharas-Purgatoire | 0 | 0 |
| **RIO GRANDE BASIN** | | |
| Rio Grande (Colo.) | 99 | 60 |
| Rio Grande abv. Otowi Bridge | 93 | 53 |
| Pecos | 0 | 0 |
| **COLORADO BASIN** | | |
| Green (Wyo.) | 88 | 152 |
| Yampa - White | 58 | 77 |
| Duchesne | 97 | 92 |
| Price | 64 | 58 |
| Upper Colorado | 76 | 93 |
| Gunnison | 70 | 63 |
| San Juan | 102 | 52 |
| Dolores | 29 | 15 |
| Virgin | 93 | 51 |
| Gila | 0 | 0 |
| Salt | 0 | 0 |
| **GREAT BASIN** | | |
| Bear | 91 | 154 |
| Logan | 94 | 169 |
| Ogden | 103 | 176 |
| Weber | 110 | 128 |
| Provo - Utah Lake | 82 | 68 |
| Jordan | 118 | 134 |
| Sevier | 54 | 42 |
| Walker - Carson | 81 | 101 |
| Tahoe - Truckee | 61 | 103 |
| Humboldt | 85 | 120 |
| Lake Co. (Oregon) | 75 | 115 |
| Harney Basin (Oregon) | 90 | 145 |
| **UPPER COLUMBIA BASIN** | | |
| Columbia (Canada) | 123 | 142 |
| Kootenai | 139 | 156 |
| Clark Fork | 130 | 160 |
| Bitterroot | 127 | 167 |
| Flathead | 130 | 148 |
| Spokane | 135 | 155 |
| Okanogan | 145 | 187 |
| Methow | 105 | 184 |
| Chelan | 124 | 163 |
| Wenatchee | 117 | 238 |

| MAJOR BASIN AND SUB—WATERSHED | WATER EQUIVALENT IN PERCENT OF: LAST YEAR | AVERAGE |
|---|---|---|
| **SNAKE BASIN** | | |
| Snake above Jackson, Wyo. | 91 | 144 |
| Snake above Hiese, Idaho | 81 | 153 |
| Snake abv. American Falls Res. | 88 | 150 |
| Henry's Fork | 70 | 120 |
| Southern Idaho Tributaries | 105 | 165 |
| Big and Little Wood | 85 | 125 |
| Boise | 105 | 160 |
| Owyhee | 290 | 215 |
| Payette | 90 | 150 |
| Malheur | 105 | 190 |
| Weiser | 75 | 135 |
| Burnt | 85 | 145 |
| Powder | 100 | 155 |
| Salmon | 105 | 150 |
| Grande Ronde | 115 | 150 |
| Clearwater | 145 | 180 |
| **LOWER COLUMBIA BASIN** | | |
| Yakima | 98 | 214 |
| Umatilla | 141 | 177 |
| John Day | 100 | 155 |
| Deschutes - Crooked | 95 | 145 |
| Hood | 95 | 180 |
| Willamette | 80 | 145 |
| Lewis | 76 | 182 |
| Cowlitz | 106 | 173 |
| **PACIFIC COASTAL BASIN** | | |
| Puget Sound | 91 | 145 |
| Olympic Peninsula | 84 | 130 |
| Umpqua - Rogue | 75 | 145 |
| Klamath | 105 | 130 |
| Trinity | 42 | 70 |
| **CALIFORNIA CENTRAL VALLEY** | | |
| Upper Sacramento | 56 | 90 |
| Feather | 41 | 70 |
| Yuba | 51 | 95 |
| American | 59 | 80 |
| Mokelumne | 68 | 75 |
| Stanislaus | 67 | 70 |
| Tuolumne | 74 | 70 |
| Merced | 78 | 70 |
| San Joaquin | 67 | 60 |
| Kings | 65 | 55 |
| Kaweah | 50 | 40 |
| Tule | 10 | 5 |
| Kern | 23 | 15 |

*Data for California Watersheds supplied by Dept. of Water Resources, and for British Columbia Watersheds by Dept. of Lands, Forests and Water Resources.*

*Average is for* 1953-67 *period.* California averages are for the period 1931-70.
*Based on Selected Snow Courses determined by Distribution within the Basin, Length of Record and Repetitive Monthly Measurement Schedules.*

Colorado's South Platte will produce a little below normal amounts, but has excellent reservoir storage. Outlook for the Arkansas is not so favorable. Here reservoir storage is poor and streamflow prospects are for near one-third less than normal.

Streamflow prospects are very unfavorable in Arizona and New Mexico where practically all of the snow has gone and most streams are already dropping to base flow values. Residual streamflow in Arizona will be near 15 to 35 percent average, while in New Mexico it will range from about 30 to 65 percent. Reservoir storage on Arizona's Salt River Project will be adequate, but New Mexico reservoir water is short. Storage in Conchas Reservoir is 45 percent, in Elephant Butte 53 percent, in El Vado 26 percent of the normal amounts.

In the Upper Colorado Basin the water outlook is excellent in Wyoming, fair to good in Utah's Uinta Basin and on Colorado's White, Yampa and upper Colorado rivers. It is poor for the Gunnison, Dolores, San Juan and smaller streams in southern Utah. Reservoir storage is favorable.

Inflow to Lake Powell on the Colorado River is forecast at 86 percent.

In the Great Basin reservoir storage is very favorable. This will be particularly important in Nevada and southern Utah. While flow of the Humboldt River will be near average, streams draining into Nevada from the Sierra Mountains will be near three-fourths of the normal amount. Late season shortages are expected in southern Utah and southern Nevada for water users dependent on natural streamflow.

With the principal exception of New Mexico, water stored for irrigation purposes continues near or well above average in the West. Storage space reserved for flood control operations has been greatly increased as reservoirs have been drawn down sharply to provide room for expected high runoff in many of the high snowpack areas.

## MISSOURI BASIN

Snow along the Continental Divide from Glacier National Park to Yellowstone National Park continues heavy, with some areas having a maximum of record snowpack. The snow decreases to near average on the Gallatin River and in the Snowy and Crazy Mountains. On the Yellowstone and Upper Clark's Fork rivers, as well as on interior mountain ranges in Montana, the snow is well above average. In general, the Montana snowpack is 130 to 150 percent average.

Streams in the heavy snowpack areas of Montana, particularly those with headwaters along the Continental Divide, are forecast to yield near 30 to 60 percent above average amounts. In the southwestern portion of the state, streams should yield a little less runoff than last year, while streams farther north are expected to produce more runoff. Other streams in the state will yield near average to 30 percent above average amounts.

In Wyoming the snow is well above average, but near 20 to 25 percent less than the record or near record amounts measured last year. It is near 120 to 150 percent of the normal snowpack. Stream forecasts range from near 120 to 145 percent of usual amounts for the Clark's Fork, Shoshone, Wind and Bighorn rivers, as well as for smaller streams such as the Tongue, Powder and other streams draining from the Big Horn Mountains.

On the North Platte River system, prospective streamflow is generally within 10 percent of average amounts, but ranges from 90 percent on the Laramie River near Glendevey to 127 percent on the Little Laramie near Fillmore.

Forecasts for the South Platte River and its tributaries are about the same as expected last month. They range from 86 percent to 98 percent.

Reservoir storage is excellent. This, combined with prospective streamflow provides a good to excellent water outlook for the coming summer. If the early summer months are dry, some limited shortages may develop for water users on natural flow rights who are served by streams draining from the Black Hills. However, reservoir storage here is good, as illustrated by Belle Fourche which holds 148 percent of its usual amount.

## ARKANSAS BASIN

Due to continuing dry weather, streamflow forecasts have been steadily dropping since February. Forecasts for streams in Colorado now range from 60 percent of average for the Purgatoire at Trinidad to 76 percent for the Arkansas at Salida. Downstream, flow of the Arkansas at Pueblo should be about 67 percent. Flow of the Cucharas near LaVeta is also forecast at 67 percent.

With these low streamflow prospects and poor reservoir storage, some water shortages are expected during late summer months. The prospective shortages will become more severe if the present dry weather trend is not broken soon.

In New Mexico, the flow of the Canadian River should be a little more than one-half of average. Storage in Conchas Reservoir is 45 percent.

## SELECTED STREAMFLOW FORECASTS MAY 1, 1972

| STREAM AND STATION | FORECASTS THIS YEAR | | Forecast Period | Last Year's Flow In (1,000 A.F.) |
|---|---|---|---|---|
| | Flow In (1,000 A.F.) | Percent of Average | | |
| **SASKATCHEWAN** | | | | |
| St. Mary near Babb, Montana 1/ | 565 | 120 | May-Sept. | |
| **UPPER MISSOURI** | | | | |
| Beaverhead near Grant, Montana 2/ | 115 | 161 | May-Sept. | 248 |
| Big Hole near Melrose, Montana | 880 | 144 | May-Sept. | |
| Jefferson at Sappington, Montana | 1,230 | 151 | May-Sept. | |
| Madison near Grayling, Montana 3/ | 545 | 145 | May-Sept. | 619 |
| Gallatin near Gateway, Montana | 505 | 115 | May-Sept. | 700 |
| Sun at Gibson Dam, Montana 4/ | 780 | 136 | May-Sept. | 701 |
| Belt near Monarch, Montana | 147 | 143 | May-Sept. | |
| Marias near Shelby, Montana 5/ | 750 | 141 | May-Sept. | 520 |
| Missouri near Landusky, Montana 6/ | 5,600 | 142 | May-Sept. | 4,821 |
| near Williston, North Dakota 7/ | 13,500 | 140 | May-Sept. | |
| S. Fk. Musselshell above Martinsdale, Montana | 52.5 | 125 | May-Sept. | 45 |
| Milk at Eastern Crossing, Montana | 200 | 91 | May-Sept. | 190 |
| Yellowstone at Yellowstone Lake Outlet, Wyo. | 1,000 | 120 | April-Oct. | 1,217 |
| at Corwin Springs, Montana | 2,340 | 130 | May-Sept. | 2,607 |
| at Miles City, Montana 8/ | 7,400 | 136 | May-Sept. | |
| Clarks Fork near Belfry, Montana | 740 | 132 | May-Sept. | 812 |
| Shoshone below Buffalo Bill Res., Wyo. 9/ | 1,070 | 132 | April-Sept. | 1,150 |
| Wind near Dubois, Wyoming | 141 | 142 | April-Sept. | |
| at Riverton, Wyoming 10/ | 870 | 134 | April-Sept. | |
| below Boysen Res., Wyoming 11/ | 1,020 | 135 | April-Sept. | |
| Bull Lake Creek near Lenore, Wyoming | 236 | 133 | April-Sept. | 248 |
| Little Popo Agie near Lander, Wyoming | 59 | 139 | April-Sept. | 73 |
| Tensleep near Tensleep, Wyoming | 89 | 120 | April-Sept. | 88 |
| Medicine Lodge near Hyattville, Wyoming | 26 | 131 | April-Sept. | 21 |
| Shell Creek near Shell, Wyoming | 84 | 128 | April-Sept. | |
| Big Horn near St. Xavier 8/ | 2,300 | 144 | May-Sept. | 2,276 |
| Tongue near Dayton, Wyoming | 125 | 121 | April-Sept. | 112 |
| No. Fork Powder near Hazelton, Wyoming | 11 | 118 | April-Sept. | 11 |
| **PLATTE** | | | | |
| North Platte at Saratoga, Wyoming | 560 | 101 | April-Sept. | |
| Encampment near Encampment, Wyoming | 140 | 110 | April-Sept. | 221 |
| Laramie near Glendevey, Wyoming 12/ | 55 | 90 | April-Sept. | |
| Big Thompson at Drake, Colorado 13/ | 90 | 90 | April-Sept. | |
| Clear at Golden, Colorado 14/ | 105 | 88 | April-Sept. | |
| St. Vrain at Lyons, Colorado 15/ | 60 | 86 | April-Sept. | |
| Cache La Poudre near Fort Collins, Colorado 16/ | 210 | 98 | April-Sept. | |
| **ARKANSAS** | | | | |
| Arkansas at Salida, Colorado 17/ | 235 | 76 | April-Sept. | |
| Cucharas near LaVeta, Colorado | 8 | 67 | April-Sept. | |
| Purgatoire at Trinidad, Colorado | 28 | 60 | April-Sept. | |
| **RIO GRANDE** | | | | |
| Rio Grande near Del Norte, Colorado 18/ | 300 | 68 | April-Sept. | |
| at Otowi Bridge, New Mexico 19/ | 260 | 51 | March-July | |
| Conejos near Mogote, Colorado 20/ | 110 | 60 | April-Sept. | |
| El Vado Res., Inflow, New Mexico | 120 | 64 | March-July | |
| Pecos at Pecos, New Mexico | 22 | 54 | March-July | |
| **UPPER COLORADO** | | | | |
| Colorado, Grandby Res. Inflow, Colorado 21/ | 195 | 89 | April-Sept. | |
| near Dotsero, Colorado 22/ | 1,200 | 87 | April-Sept. | |
| near Cameo, Colorado 23/ | 1,850 | 83 | April-Sept. | |
| near Cisco, Utah 24/ | 1,884 | 67 | April-July | |
| Lake Powell Inflow, Arizona 25/ | 5,610 | 86 | April-July | 8,378 |
| Roaring Fork at Glenwood Springs, Colorado 26/ | 485 | 70 | April-Sept. | |
| Uncompahgre at Colona, Colorado | 80 | 62 | April-Sept. | |

*Forecasts in California provided by Department of Water Resources.*
*Average is for 1953–67 period except California. California is computed for 1916–65 period.*
*Forecasts assume average Effective Climate Conditions from Date Through Snow Melt Season.*

*Explanatory Notes on Forecasts listed on Inside Back Cover.*

## SELECTED STREAMFLOW FORECASTS MAY 1, 1972

| STREAM AND STATION | FORECASTS THIS YEAR | | Forecast Period | Last Year's |
|---|---|---|---|---|
| | Flow In (1,000 A.F.) | Percent of Average | | Flow In (1,000 A.F.) |
| UPPER COLORADO (continued) | | | | |
| Gunnison, Blue Mesa Res. Inflow, Colorado 27/ | 500 | 65 | April-Sept. | |
| near Grand Junction, Colorado 28/ | 700 | 62 | April-Sept. | |
| Dolores at Dolores, Colorado | 150 | 65 | April-Sept. | |
| Green at Warren Bridge, Wyoming | 400 | 124 | April-Sept. | 452 |
| at Green River, Wyoming 29/ | 1,320 | 140 | April-Sept. | |
| Flaming Gorge Res. Inflow, Utah 27/ | 1,510 | 143 | April-July | 1,905 |
| at Green River, Utah 30/ | 2,964 | 115 | April-July | |
| North Piney at Mason, Wyoming | 55 | 160 | April-Sept. | 67 |
| Big Sandy near Big Sandy, Wyoming | 70 | 132 | April-Sept. | 69 |
| Yampa at Steamboat Springs, Colorado | 225 | 87 | April-Sept. | |
| near Maybell, Colorado | 750 | 88 | April-Sept. | |
| Little Snake near Dixon, Wyoming | 272 | 105 | April-Sept. | 486 |
| White near Meeker, Colorado | 210 | 72 | April-Sept. | |
| Strawberry at Duchesne, Utah 40/ | 40 | 100 | May-July | |
| Duchesne near Tabiona, Utah 31/ | 115 | 135 | May-July | |
| at Randlett, Utah 40/ | 260 | 114 | May-July | |
| Lakefork below Moon Lake, Utah 32/ | 60 | 95 | May-July | |
| Uinta near Neola, Utah | 73 | 97 | May-July | |
| Whiterocks near Whiterocks, Utah | 45 | 94 | May-July | |
| Price, Scofield Res. Inflow, Utah 33/ | 20 | 74 | May-July | |
| Cottonwood near Orangeville, Utah 34/ | 29 | 71 | May-July | |
| San Juan, Navajo Res. Inflow, New Mexico 27/ | 360 | 58 | April-July | 305 |
| near Bluff, Utah 35/ | 472 | 53 | April-July | |
| Animas at Durango, Colorado | 250 | 61 | April-Sept. | |
| LOWER COLORADO | | | | |
| Virgin near Virgin, Utah | 10 | 45 | May-June | |
| Little Colorado above Lyman, Arizona | --- | --- | --- | --- |
| Gila near Solomon, Arizona | --- | --- | --- | --- |
| Frisco at Clifton, Arizona | --- | --- | --- | --- |
| Salt Intake, Arizona | 25 | 21 | April-May | 27.1 |
| Tonto above Roosevelt, Arizona | 1.1 | 14 | April-May | 1.3 |
| Verde above Horseshoe Dam, Arizona | 18 | 36 | April-May | 21.0 |
| GREAT BASIN | | | | |
| Bear at Utah-Wyo. State Line | 140 | 140 | May-July | 129 |
| at Harer, Idaho | 340 | 189 | May-Sept. | |
| Smith's Fork near Border, Wyoming | 157 | 145 | April-Sept. | 198 |
| Thomas Fork near Wyo.Ida. State Line | 51 | 162 | April-Sept. | 70 |
| Logan near Logan, Utah 36/ | 150 | 174 | May-July | 178 |
| Ogden, Pine View Res. Inflow, Utah 27/ | 102 | 173 | May-June | 92 |
| Weber near Oakley, Utah | 105 | 126 | May-June | |
| Provo near Hailstone, Utah 37/ | 98 | 120 | May-July | |
| Strawberry Res. Inflow, Utah | 26 | 83 | May-July | |
| Utah Lake Net Inflow, Utah | 160 | 118 | May-July | |
| Big Cottonwood near Salt Lake City, Utah | 36 | 120 | May-July | |
| Beaver near Beaver, Utah | 7.5 | 45 | May-July | |
| Sevier near Hatch, Utah | 15.3 | 57 | May-July | |
| near Gunnison, Utah | 10 | 46 | May-July | |
| So. Fork Humboldt near Elko, Nevada | 45 | 90 | May-July | 116 |
| Humboldt at Palisades, Nevada | 120 | 98 | May-July | 396 |
| Truckee at Farad, California 38/ | 150 | 79 | May-July | 309 |
| East Carson near Gardnerville, Nevada | 113 | 79 | May-July | 224 |
| West Carson at Woodsfords, California | 32 | 80 | May-July | 49 |
| East Walker near Bridgeport, California 39/ | 38 | 70 | May-August | 72 |
| West Walker near Coleville, California | 103 | 82 | May-July | 137 |
| Donner und Blitzen near Frenchglen, Oregon | 56 | 124 | May-Sept. | |
| Silvies near Burns, Oregon | 50 | 123 | May-Sept. | 58 |
| Chewaucan near Paisley, Oregon | 62 | 100 | May-Sept. | 129 |
| Deep above Adel, Oregon | 53 | 120 | May-Sept. | 102 |
| Bidwell near Ft. Bidwell, California | 15.3 | 170 | May-July | 14 |

*Forecasts in California provided by Department of Water Resources.*
*Average is for 1953–67 period except California. California is computed for 1916–65 period.*
*Forecasts assume average Effective Climate Conditions from Date Through Snow Melt Season.*

*Explanatory Notes on Forecasts listed on Inside Back Cover.*

## SELECTED STREAMFLOW FORECASTS MAY 1, 1972

| STREAM AND STATION | FORECASTS THIS YEAR | | Forecast Period | Last Year's Flow In (1,000 A.F.) |
|---|---|---|---|---|
| | Flow In (1,000 A.F.) | Percent of Average | | |
| **UPPER COLUMBIA** | | | | |
| Columbia above Steamboat Rapids, B. C. | 21,500 | 122 | May-Sept. | 17,980 |
| at Birchbank, British Columbia 40/ | 53,570 | 123 | May-Sept. | 45,730 |
| at Grand Coulee, Washington 40/ | 80,000 | 127 | May-Sept. | 68,303 |
| Kootenai at Libby, Montana | 9,550 | 128 | May-Sept. | 8,354 |
| at Leonia, Idaho | 11,000 | 131 | May-Sept. | 9,662 |
| Blackfoot near Bonner, Montana | 1,330 | 148 | May-Sept. | 1,136 |
| So. Fk. Flathead nr Columbia Falls, Montana 40/ | 2,900 | 137 | May-Sept. | 2,521 |
| Flathead at Columbia Falls, Montana 40/ | 8,000 | 136 | May-Sept. | 6,878 |
| near Polson, Montana 40/ | 9,500 | 137 | May-Sept. | 7,989 |
| Clark Fork above Missoula, Montana | 2,370 | 153 | May-Sept. | 1,824 |
| near Plains, Montana 40/ | 16,000 | 144 | May-Sept. | 13,337 |
| at Whitehorse Rapids, Idaho | 17,800 | 144 | May-Sept. | 15,006 |
| Bitterroot near Darby, Montana | 755 | 150 | May-Sept. | 700 |
| Priest near Priest River, Idaho 41/ | 715 | 99 | May-July | |
| Pend Oreille below Box Canyon, Washington | 19,800 | 143 | May-Sept. | |
| Kettle near Laurier, Washington | 1,950 | 117 | May-Sept. | 2,020 |
| Spokane at Post Falls, Idaho 42/ | 3,500 | 166 | May-Sept. | 2,862 |
| Similkameen near Nighthawk, Washington | 2,080 | 147 | May-Sept. | |
| Okanogan near Tonasket, Washington | 2,450 | 152 | May-Sept. | |
| Methow near Pateros, Washington | 1,470 | 152 | May-Sept. | |
| Stehekin at Stehekin, Washington | 1,280 | 155 | May-Sept. | |
| Chelan at Chelan, Washington 43/ | 1,720 | 150 | May-Sept. | |
| Wenatchee at Peshastin, Washington | 2,409 | 150 | May-Sept. | |
| **SNAKE** | | | | |
| Snake above Palisades Res., Wyoming 44/ | 3,520 | 138 | April-Sept. | 4,048 |
| near Heise, Idaho 45/ | 4,650 | 136 | May-Sept. | 5,766 |
| near Blackfoot, Idaho 46/ | 4,750 | 135 | May-July | |
| at Weiser, Idaho | 6,250 | 125 | May-Sept. | 8,300 |
| Grey's above Palisade, Wyoming | 590 | 163 | April-Sept. | |
| Salt above Palisade, Wyoming | 500 | 156 | April-Sept. | |
| Henry's Fork near Ashton, Idaho 47/ | 565 | 110 | May-Sept. | |
| Teton near St. Anthony, Idaho | 405 | 115 | May-Sept. | |
| Blackfoot Reservoir Inflow, Idaho | 135 | 132 | April-Sept. | |
| Big Lost near MacKay, Idaho 48/ | 165 | 104 | May-Sept. | |
| Portneuf at Topaz, Idaho | 70 | 125 | May-Sept. | |
| Salmon Falls Creek nr San Jacinto, Idaho | 70 | 151 | May-Sept. | |
| Big Wood, Inflow to Magic Res., Idaho 49/ | 260 | 141 | May-Sept. | |
| Bruneau near Hot Springs, Idaho | 210 | 148 | May-Sept. | |
| Boise near Boise, Idaho 50/ | 1,800 | 147 | May-Sept. | 2,087 |
| Jordan near Jordan Valley, Oregon | 66 | 138 | May-July | |
| Owyhee near Owyhee, Nevada 51/ | 50 | 132 | May-July | 128 |
| Owyhee Res. Net Inflow, Oregon 27/ | 232 | 130 | May-Sept. | 277 |
| Malheur near Drewsey, Oregon | 53 | 156 | May-Sept. | 61 |
| Payette near Horseshoe Bend, Idaho 52/ | 1,950 | 129 | May-Sept. | 2,485 |
| Weiser above Crane Creek, Idaho 40/ | 325 | 122 | May-Sept. | |
| Burnt near Hereford, Oregon 40/ | 20.4 | 132 | May-Sept. | 29 |
| Powder near Sumpter, Oregon | 44 | 118 | May-Sept. | |
| Eagle above Skull Creek, Oregon | 210 | 135 | May-Sept. | 240 |
| Imnaha at Imnaha, Oregon | 300 | 133 | May-Sept. | 380 |
| Salmon at Whitebird, Idaho | 8,050 | 130 | May-Sept. | 9,682 |
| Lostine near Lostine, Oregon | 148 | 128 | May-Sept. | 151 |
| Grande Ronde at LaGrande, Oregon | 120 | 114 | May-Sept. | 126 |
| Clearwater at Spalding, Idaho | 10,250 | 150 | May-Sept. | 9,067 |
| **LOWER COLUMBIA** | | | | |
| Yakima at CleElum, Washington 53/ | 1,217 | 154 | May-Sept. | |
| near Parker, Washington 54/ | 2,158 | 165 | May-Sept. | |
| Naches near Naches, Washington 55/ | 1,197 | 160 | May-Sept. | |
| Walla Walla, So. Fk. near Milton, Oregon | 65 | 130 | May-Sept. | 68 |

*Forecasts in California provided by Department of Water Resources.*
*Average is for 1953–67 period except California. California is computed for 1916–65 period.*
*Forecasts assume average Effective Climate Conditions from Date Through Snow Melt Season.*

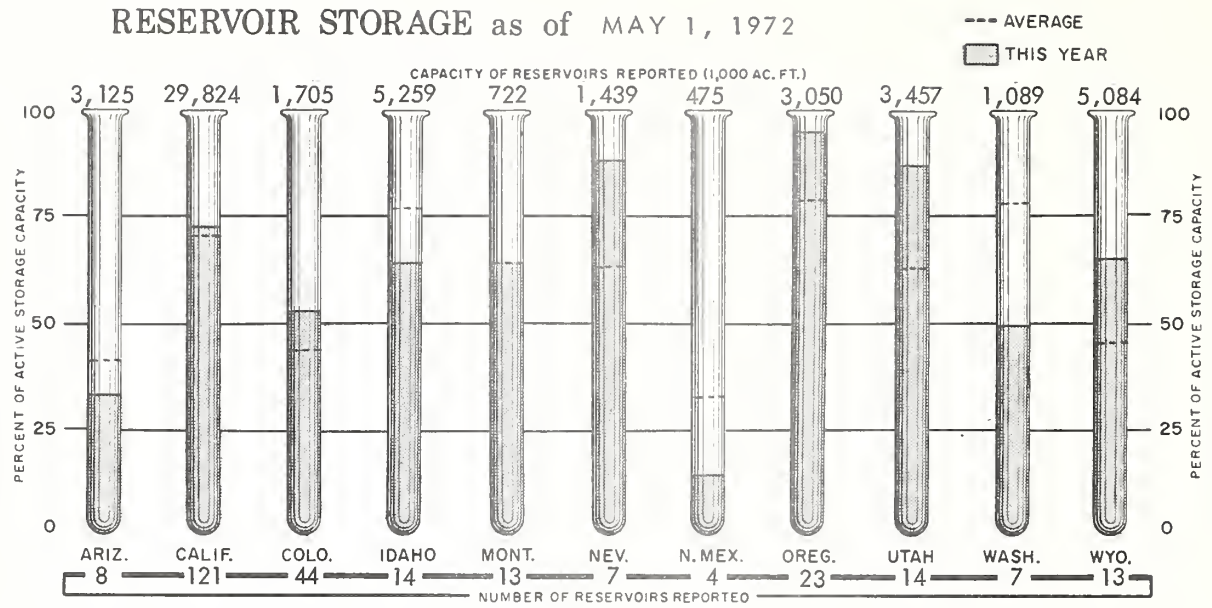
*Explanatory Notes on Forecasts listed on Inside Back Cover.*

## SELECTED STREAMFLOW FORECASTS MAY 1, 1972

| STREAM AND STATION | FORECASTS THIS YEAR | | Forecast Period | Last Year's Flow In (1,000 A.F.) |
|---|---|---|---|---|
| | Flow In (1,000 A.F.) | Percent of Average | | |
| LOWER COLUMBIA (continued) | | | | |
| Umatilla at Pendleton, Oregon | 91 | 113 | May-Sept. | 88 |
| John Day, Middle Fork at Ritter, Oregon | 80 | 108 | May-Sept. | 88 |
| North Fork at Monument, Oregon | 376 | 100 | May-Sept. | |
| Crooked near Post, Oregon | 52 | 130 | May-Sept. | |
| Deschutes at Benham Falls, Oregon 40/ | 609 | 119 | May-Sept. | |
| Columbia at The Dalles, Oregon 40/ | 118,500 | 128 | May-Sept. | 108,712 |
| Hood near Tucker Bridge, Oregon 40/ | 295 | 121 | May-Sept. | |
| McKenzie near Vida, Oregon | 1,312 | 133 | May-Sept. | |
| Santiam, South, at Waterloo, Oregon | 506 | 135 | May-Sept. | |
| North, at Mehama, Oregon 40/ | 754 | 123 | May-Sept. | |
| Clackamas at Estacada, Oregon | 709 | 125 | May-Sept. | |
| Willamette at Salem, Oregon 40/ | 4,075 | 124 | May-Sept. | |
| Lewis at Ariel, Washington 56/ | 1,410 | 147 | May-Sept. | 1,397 |
| Cowlitz at Castle Rock, Washington 57/ | 2,940 | 139 | May-Sept. | |
| NORTH PACIFIC COASTAL | | | | |
| Dungeness near Sequim, Washington | 166 | 108 | May-Sept. | |
| Umpqua, No., near Tokatee Falls, Oregon 40/ | 165 | 112 | May-Sept. | |
| Rogue at Raygold, Oregon | 740 | 108 | May-Sept. | 961 |
| Klamath Lake, Net Inflow, Oregon | 419 | 100 | May-Sept. | 563 |
| Trinity at Lewiston, California | 460 | 75 | April-July | 734 |
| CALIFORNIA CENTRAL VALLEY 40/ | | | | |
| Sacramento, Inflow to Shasta, California | 1,530 | 86 | April-July | 2,332 |
| Feather near Oroville, California | 1,180 | 63 | April-July | 2,701 |
| Yuba at Smartville, California | 750 | 70 | April-July | 1,387 |
| American, Inflow to Folsom Res., Calif. | 840 | 64 | April-July | 1,445 |
| Cosumnes at Michigan Bar, California | 60 | 41 | April-July | 123 |
| Mokelumne, Inflow to Pardee Res., Calif. | 300 | 65 | April-July | 490 |
| Stanislaus, Inflow to Melones Res., Calif. | 420 | 59 | April-July | 664 |
| Tuolumne, Inflow to Don Pedro Res., Calif. | 730 | 61 | April-July | 1,058 |
| Merced, Inflow to Exchequer Res., Calif. | 310 | 51 | April-July | 502 |
| San Joaquin, Inflow to Millerton Lake, Calif. | 580 | 49 | April-July | 970 |
| Kings, Inflow to Pine Flat Res., California | 445 | 38 | April-July | 820 |
| Kaweah, Inflow to Terminus Res., California | 65 | 24 | April-July | 196 |
| Tule, Inflow to Success Res., California | 7 | 12 | April-July | 36.7 |
| Kern, Inflow to Isabella Res., California | 85 | 20 | April-July | 230 |
| ALASKA | | | | |
| Chena at Fairbanks, Alaska | 750 | 170 | May-June | 658 |
| Salcha near Salchaket, Alaska | 855 | 146 | May-June | 878 |

*Forecasts in California provided by Department of Water Resources.*
*Average is for 1953-67 period except California. California is computed for 1916-65 period.*
*Forecasts assume average Effective Climate Conditions from Date Through Snow Melt Season.*

*Explanatory Notes on Forecasts listed on Inside Back Cover.*




## RIO GRANDE BASIN

Only the extreme high elevations in New Mexico have any snow left. On the Rio Grande headwaters in Colorado the snow is only a little above half of the usual amount. This poor snow cover indicates that flow of the Rio Grande River and its tributaries will be near 50 to 65 percent in New Mexico, 60 to 70 percent in Colorado. Flow of the Pecos River is expected to be essentially half of average (54 percent).

Unless summer rains are unusually plentiful, water supplies will be very deficient. This applies particularly to water users on natural flow rights and to those having limited storage rights. Storage in Elephant Butte Reservoir is 53 percent of average, while El Vado holds 26 percent of its normal supply. Carryover storage for next year will be very poor.

Extreme conservation of water supplies will be necessary this summer.

## COLORADO BASIN

Dry weather during April has reduced water supply prospects for the Colorado River Basin during the coming summer.

The present snow cover in the upper Colorado River Basin is near 85 percent of average when considered as a whole, but it shows extreme variability within the Basin. Snow cover is heaviest on tributaries to the Green River in Wyoming where it averages 152 percent of usual amounts. The snow decreases steadily south of here, with about 75 to 95 percent shown on the Yampa, White, upper Colorado (in Colorado) and Duchesne rivers. It drops to 50 to 65 percent on the Gunnison, San Juan, Price and San Rafael rivers. It is only 15 percent on the Dolores River.

Forecasts for streams tributary to the upper Green River in Wyoming range from about 125 to 160 percent of average. Total inflow to Flaming Gorge Reservoir in Utah is now expected to be 143 percent. In Colorado the Yampa and upper Colorado should yield near 12 percent less than usual, while the White, Gunnison, Roaring Fork and Uncompahgre rivers should flow at near 60 to 70 percent, with the Animas and San Juan yielding about 50 to 60 percent. In Utah the Duchesne will supply about 15 percent more than usual, while the Price and San Rafael will fall 25 to 30 percent below normal.

Unregulated flow of the principal tributaries is forecast as follows: Green at Green River, Utah 115 percent; Colorado near Cisco, Utah 67 percent and San Juan near Bluff, Utah 53 percent. Total inflow to Lake Powell, Arizona is forecast at 5,610,000 acre-feet for the April-July period, or 86 percent average. Storage in irrigation reservoirs is well above average.

April weather continued its dry pattern in the Lower Colorado Basin. All watersheds have prospects for below normal streamflow. Highest streamflow forecast is for the Virgin River in Utah (45 percent). Snowmelt runoff in

## STORAGE IN LARGE RESERVOIRS MAY 1, 1972

| BASIN AND NAME OF RESERVOIR | CAPACITY (1,000 A.F.) | STORAGE (1,000 A.F.) | STORAGE PERCENT AVERAGE |
|---|---|---|---|
| UPPER MISSOURI | | | |
| Belle Fourche | 185 | 165 | 148 |
| Boysen | 550 | 252 | 71 |
| Buffalo Bill | 373 | 106 | 86 |
| Canyon Ferry | 2,043 | 1,533 | 98 |
| Fort Peck | 19,410 | 16,550 | 148 |
| Garrison | 24,790 | 21,380 | 192 |
| Hebgen | 377 | 182 | 93 |
| Keyhole | 192 | 169 | 433 |
| Lake Francis Case | 5,816 | 4,487 | 115 |
| Lake Sharp | 1,900 | 1,743 | 104 |
| Oahe | 23,630 | 19,899 | 156 |
| Tiber | 1,347 | 558 | 85 |
| Big Horn | 1,356 | 792 | 107 |
| PLATTE | | | |
| City of Denver (5) | 507 | 425 | 111 |
| Colo-Big Thompson (3) | 718 | 560 | 137 |
| Glendo | 784 | 502 | 124 |
| Pathfinder | 1,016 | 925 | 211 |
| Seminoe | 1,010 | 583 | 195 |
| ARKANSAS | | | |
| Conchas | 273 | 68 | 45 |
| John Martin | 354 | 0 | 0 |
| RIO GRANDE | | | |
| Elephant Butte | 2,195 | 172 | 53 |
| El Vado | 195 | 8 | 26 |
| UPPER COLORADO | | | |
| Blue Mesa | 830 | 320 | --- |
| Flaming Gorge | 3,749 | 2,728 | --- |
| Navajo | 1,696 | 847 | --- |
| Powell | 25,002 | 13,224 | --- |
| Starvation | 152 | 127 | --- |
| LOWER COLORADO | | | |
| Havasu | 619 | 592 | 100 |
| Mead | 26,159 | 17,015 | 106 |
| Mohave | 1,810 | 1,689 | 98 |
| Salt River Res. (4) | 1,755 | 870 | 84 |
| San Carlos | 985 | 82 | 73 |
| Verde River Res. (2) | 318 | 64 | 47 |
| GREAT BASIN | | | |
| Bear | 1,421 | 1,204 | 126 |
| Lahontan | 314 | 277 | 125 |
| Rye Patch | 179 | 188 | 227 |
| Sevier Bridge | 236 | 173 | 183 |
| Strawberry | 274 | 219 | 166 |
| Tahoe | 732 | 582 | 126 |
| Utah | 884 | 856 | 138 |
| Willard Bay | 193 | 177 | --- |

| BASIN AND NAME OF RESERVOIR | CAPACITY (1,000 A.F.) | STORAGE (1,000 A.F.) | STORAGE PERCENT AVERAGE |
|---|---|---|---|
| UPPER COLUMBIA | | | |
| Chelan | 676 | 205 | 98 |
| Coeur d'Alene | 225 | 209 | 73 |
| Duncan | 1,347 | 52 | --- |
| Flathead | 1,791 | 976 | 104 |
| Hungry Horse | 3,428 | 1,255 | 64 |
| Kootenay | 673 | 189 | 41 |
| Lower Arrow | 3,083 | 31 | 6 |
| Noxon Rapids | 335 | 182 | 126 |
| Pend Oreille | 1,155 | 346 | 70 |
| Roosevelt | 5,232 | 497 | 20 |
| Upper Arrow | 4,061 | 6 | 1 |
| LOWER COLUMBIA | | | |
| Cougar | 155 | 129 | --- |
| Detroit | 300 | 255 | 110 |
| Green Peter | 270 | 208 | --- |
| Hills Creek | 200 | 165 | 101 |
| Lookout Point | 337 | 246 | 85 |
| Prineville | 153 | 152 | 103 |
| Wickiup | 200 | 198 | 102 |
| Yakima Res. (5) | 1,066 | 511 | 62 |
| SNAKE | | | |
| American Falls | 1,700 | 1,650 | 99 |
| Anderson Ranch | 423 | 254 | 89 |
| Arrowrock | 287 | 142 | 62 |
| Brownlee | 980 | 21 | --- |
| Cascade | 653 | 218 | 67 |
| Jackson | 847 | 501 | 114 |
| Lucky Peak | 278 | 56 | 38 |
| Owyhee | 715 | 708 | 133 |
| Palisades | 1,200 | 199 | 25 |
| Warm Springs | 191 | 180 | 131 |
| PACIFIC COASTAL | | | |
| Clair Engle | 2,448 | 2,349 | 107 |
| Clear Lake | 440 | 416 | 156 |
| Nacimiento | 350 | 62 | 28 |
| Ross | 1,203 | 769 | 110 |
| Upper Klamath | 584 | 538 | 104 |
| CALIFORNIA CENTRAL VALLEY | | | |
| Almanor | 1,036 | 782 | 98 |
| Berryessa | 1,602 | 1,361 | 87 |
| Folsom | 1,010 | 865 | 120 |
| Isabella | 570 | 113 | 58 |
| McClure | 1,026 | 574 | 91 |
| Millerton | 521 | 338 | 93 |
| Bullards Bar | 930 | 757 | 117 |
| Oroville | 3,484 | 3,424 | 124 |
| Pine Flat | 1,013 | 489 | 73 |
| Shasta | 4,500 | 4,363 | 103 |

*Reservoir Storage Data Provided by Bureau of Reclamation , Corps of Engineers, Geological Survey. and water using organizations. Data from California and British Columbia provided by Department of Water Resources and Department of Lands, Forests and Water Resources, respectively.*

Arizona has occurred. The expected runoff of 15 to 35 percent is base flow on most streams.

Fortunately, reservoir storage, though steadily declining, is 80 percent of average for this date. There is adequate water for this year on most projects, but carryover will be very low and severe shortages are possible next year. Heavy ground water pumping will again be required in the Gila Valley to meet water demands.

## GREAT BASIN

Considering the very favorable reservoir storage throughout the Great Basin, with streamflow prospects for most major irrigated areas varying from near 75 percent to more than double usual amounts, the summer's water supply should prove to be fair to exceptionally good for most water users.

Late summer shortages are anticipated in Nevada on smaller streams coming from lower elevation watersheds, particularly in southern areas. In southern Utah on the Sevier, San Pitch and Beaver rivers and smaller streams near Cedar City, water users on natural flow rights will experience definite shortages. Flow of these streams is expected to range from about 45 to 70 percent of average. Fortunately, storage in the three main Sevier River reservoirs is 168 percent of average.

The snowpack varies considerably. In southern areas of Utah and Nevada the snow ranges from zero to near half of average. In northern Utah and on Nevada's Jarbidge Mountains snow water equivalents vary from average to 175 percent. In Nevada's Sierra Nevada Mountains the low and mid-elevation snowpack was depleted early. The remaining high elevation snowpack is normal for this date.

Highest May-July runoff forecasts in Nevada are on northern tributaries to the Humboldt River near Elko. These streams are expected to produce 20 to 40 percent above normal. The main Humboldt and its other tributaries are forecast at 90 to 110 percent, flow of the Truckee, Carson, Walker and Owens rivers will be near 70 to 80 percent. Reservoirs in Nevada now hold 86 percent of their capacity and are at 140 percent of normal.

Flow of the Bear River and its tributary streams in Utah, Idaho and Wyoming will generally be near 140 percent to over twice their usual amounts. Streamflow on the Weber-Ogden rivers will be similar to the Bear River. Prospective flow of streams draining into Utah Lake varies from about 80 to 120 percent.

Reservoir storage in 14 of Utah's major reservoirs was 138 percent of the May 1 average for the 1953-67 period.

In southern Oregon's Harney County the water outlook is very favorable, with streams forecast at 20 to 25 percent above normal. In Lake County the forecasts range from average to 20 percent above.

In view of the water outlook in surrounding areas, prospects for California's Surprise Valley are surprising. Streams here are forecast at 170 to 185 percent of normal amounts.

## COLUMBIA BASIN

The water supply outlook remains good to excellent throughout the Columbia Basin. Cool April weather delayed snowmelt and maintained a serious flood potential on many watersheds, particularly if an adverse sequence of temperatures and/or precipitation should develop during the main snowmelt period.

Most watersheds in the Columbia Basin have a snowpack which is over 140 percent of average. Percentagewise, the snow is particularly heavy along the Cascade Mountains of Washington, British Columbia and the Hood River of Oregon; on the east Kootenay in British Columbia, Montana's upper Clark Fork and Bitterroot rivers, Idaho's Clearwater and Bruneau rivers and Oregon's Owyhee, Malheur and Umatilla rivers. The snow on these streams ranges from near 165 to over 200 percent of average.

In the above areas, many snow courses have maximum or near maximum of record snowpacks for May 1st. Some courses have set new all season record high readings.

The present heavy snowpack indicates that the main snowmelt period will produce an unregulated peak flow of near 850 thousand to one million second feet at The Dalles, Oregon. These flows would result in a river stage at Vancouver of 28 to 31 feet. Actual flow and river stage will depend on snowmelt conditions during late May and early June, and on the amount that river regulation reduces the flow. River management agencies have indicated that reservoir regulation will reduce the river stage at Vancouver to about 21 to 23 feet.

Most major irrigation reservoirs are full or nearly full, except where they have been drawn down to provide space for flood control. These should refill and reservoir storage carryover for next year should be excellent.

Because of the heavy snowpacks, record or near record high streamflow is expected from streams in British Columbia, Montana, the

Spokane and Clearwater rivers in Idaho and streams flowing from the Cascades in Washington. Forecasts for most of these streams range from about 130 to 165 percent of normal.

Although not record or near record high, forecasts for most tributaries to the Snake River are far above average and vary from about 125 to 160 percent. Lowest forecast on the Snake River is 95 percent for Idaho's Little Wood River, while the Big Wood, Henry's Fork, Teton, Grande Ronde, Weiser and Powder rivers are forecast at 5 to 20 percent above normal. Most Oregon streams other than those that are tributary to the Snake River will yield from near average to 30 percent above average amounts.

## ALASKA

Many snow courses in Alaska have a snowpack which is maximum of record. Cool April weather left the low elevation snow unmelted, while the higher elevation snow continued to increase. Spring runoff will approach 150 to 200 percent of normal over a wide area of Alaska. Among these will be interior rivers such as the Yukon and Tanana, as well as southeastern Alaska streams, and rivers discharging into Cook Inlet.

## CALIFORNIA

The California Department of Water Resources, coordinating agency for snow surveys in California, reports that the May 1 snow surveys along with reports on precipitation, streamflow, etc., confirm that only in watersheds along the Oregon border are normal conditions prevailing. Forecasts of snowmelt runoff for the Central Valley tributaries indicate 1972 April-July flows will be the sixth lowest of the past 20 years. Although this summer will be dry and probably hot, no general critical water shortages are expected due to ample supply of storage in surface reservoirs along with facilities to transfer large amounts to areas of need plus the ability to supplement surface supplies by pumping from ground water sources.

In Southern California, the benefit to local supplies received from the heavy precipitation of last December has fast eroded away by subsequent months of record drought. Thus, the dependence upon local supplies becomes a way of life.

Precipitation in California during April mostly came in the first half of the month from two moderate to light storms. Statewide, precipitation for April averaged 80 percent of normal with above normal amounts generally limited to the central Sierra and North Coastal area. In Southern California, April produced some 0.03 inch of precipitation at the Los Angeles Civic Center which made a total for the 4-month period January through April of 0.16 inch at this station, an all-time low and some 9.50 inches below that normally expected. May 1 generally marks the end of the major precipitation and snow accumulation in California. While it is still possible for rather heavy general storms to materialize, such occurrences cannot be planned upon.

May 1 snow surveys of some 160 key snow courses and 65 aerial marker observations indicate that the water content in the State's snowpack was about 70 percent of normal for May 1 or 50 percent of the April 1 average. Although many high elevation snow courses from the Kings River Basin north showed water content gains since April 1, most low and many middle elevation snow courses were bare. The May 1 measurements indicated that only in the Central Sierra was the snowpack's water content near normal. To the north, the Feather River Basin dropped to 70 percent of normal while to the south the Tule River Basin was only 5 percent of the normal for May 1.

Runoff from California's major streams during April was below average over the entire State, averaging about 75 percent of normal. Runoff from nonsnowmelt streams during April averaged less than 15 percent of normal, except in the North Coastal area where runoff for the month was 88 percent of normal. Runoff from snowmelt streams tributary to the Central Valley averaged about 70 percent of normal for the month. In the Sacramento Valley, the April runoff for individual river basins ranged from slightly below normal for the Upper Sacramento River to 54 percent of normal for the Cosumnes River Basin. San Joaquin Valley tributaries' runoff varied from a high of 63 percent of normal for the Stanislaus River Basin to a low of 16 percent of normal for the Tule River Basin.

Storage on May 1, 1972 in 121 major California reservoirs, with a combined capacity of 29,824,000 acre-feet, was 21,332,000 acre-feet, slightly above the May 1 average for the aggregate storage. This is just over 1,000,000 acre-feet less than was in storage at this time one year ago. In the Central Valley, aggregate storage in the major reservoirs was just average for May 1. With variation within the individual river basins, aggregate storage in Sacramento and San Joaquin Valley major reservoirs was 105 and 95 percent of their 10-year average, respectively.


U. S. DEPARTMENT of AGRICULTURE
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# EXPLANATION of STREAMFLOW FORECASTS

All flows are observed flows except as adjusted for: 1/ Storage change in Lake Sherburne. 2/ Storage change in Lima and Clark Canyon reservoirs. 3/ Storage change in Hebgen Lake. 4/ Storage change in Gibson Reservoir and measured diversions. 5/ Storage change in Two Medicine, Four Horns, Lake Francis and Swift reservoirs. 6/ Storage change in Canyon Ferry and Tiber reservoirs. 7/ Changes as indicated in (6/), (8/), plus storage change in Fort Peck. 8/ Storage change in Boysen, Buffalo Bill and Yellowtail reservoirs. 9/ Storage change in Buffalo Bill Reservoir plus Heart Mountain diversion. 10/ Storage change in Pilot Butte and Bull Lake reservoirs plus Wyoming canal diversion.

11/ Changes indicated in (10/) plus storage change in Boysen Reservoir. 12/ Plus diversions to Cache LaPoudre. 13/ Plus by-pass to power plants. 14/ Minus diversion thru Gumlick Tunnel. 15/ Storage change in Price Reservoir. 16/ Minus diversions from North Platte, Laramie and Colorado rivers plus measured diversions above station. 17/ Storage change in Clear Creek, Twin Lakes and Turquoise reservoirs minus diversions from Colorado River. 18/ Storage change in Rio Grande, Santa Maria and Continental reservoirs. 19/ Storage change in El Vado and Abiquiu reservoirs. 20/ Storage change in Platoro Reservoir.

21/ Storage change in Grandby Reservoir as furnished by U.S.B.R. plus diversions by Adams Tunnel and Grand River Ditch. 22/ Changes as indicated in (21/) plus diversions thru Roberts, Gumlick and Moffat tunnels and storage change in Dillon, Homestake, Williams Fork, Green Mountain and Willow Creek reservoirs. 23/ Changes indicated in (22/) and (26/). 24/ Storage change in Blue Mesa Reservoir. 25/ Changes indicated in (24/), (30/) and (35/) and storage change in Lake Powell. 26/ Diversions to Arkansas River plus storage change in Ruedi Reservoir. 27/ (Inflow record as computed by U. S. Bureau of Reclamation.) 28/ Storage change in Taylor, Blue Mesa and Morrow Point reservoirs. 29/ Storage change in Fontenelle Reservoir. 30/ Storage change in Flaming Gorge Reservoir.

31/ Plus diversion through Duchesne Tunnel. 32/ Storage change in Moon Lake Reservoir. 33/ Storage change in Scofield Reservoir. 34/ Storage change in Joe's Valley Reservoir. 35/ Storage change in Navajo Reservoir. 36/ Plus U. P. & L. Co. tailrace and Logan, Hyde Park and Smithfield canals. 37/ Minus diversions thru Duchesne Tunnel and Weber-Provo Canal. 38/ Storage change in Lake Tahoe and Boca reservoirs (Forecast by Truckee Basin Committee.) 39/ Storage change in Bridgeport Reservoir. 40/ Corrected for major upstream impairments -- represents simulated natural flow conditions.

41/ Storage change in Priest Lake. 42/ Storage change in Coeur d'Alene Lake and diversions by Spokane Valley Farms Co. and Rathrum Prairie canals. 43/ Storage change in Lake Chelan. 44/ Storage change in Jackson Lake. 45/ Storage change in Jackson Lake and Palisade reservoirs. 46/ Storage change in Jackson Lake, Palisades, Island Park, Henry's Lake, Grassy Lake plus diversions between Heise and Blackfoot. 47/ Storage change in Henry's Lake and Island Park reservoirs. 48/ Storage change in MacKay Reservoir and diversion in Sharp Ditch. 49/ Combined flow Big Wood near Bellevue and Camas Creek near Blaine. 50/ Storage change in Arrowrock, Anderson Ranch and Lucky Peak reservoirs.

51/ Storage change in Wild Horse Reservoir. 52/ Storage change in Cascade and Deadwood reservoirs. 53/ Storage change in Keechelus, Kachess and CleElum reservoirs plus diversion by Kittitas Canal. 54/ Changes indicated in (52/) plus storage change in Bumping and Rimrock Lakes plus diversion by Roza, Union Gap, New Reservation, Old Reservation and Sunrise canals. 55/ Storage change in Bumping and Rimrock lakes and diversions by Tieton, Selah Valley, Wapatox canals and City of Yakima. 56/ Storage change in Merwin, Yale and Swift reservoirs. 57/ Storage change in Mayfield Reservoir.

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